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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,935	02/10/2004	Takeshi Nogami	09792909-5802	3159
26263 7590 11/28/2007 SONNENSCHN NATH & ROSENTHAL LLP P.O. BOX 061080 WACKER DRIVE STATION, SEARS TOWER CHICAGO, IL 60606-1080			EXAMINER VAN, LUAN V	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 11/28/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/775,935

Applicant(s)

NOGAMI ET AL.

Examiner

Luan V. Van

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-6 and 9-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-6, 9-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413):
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 31, 2007 has been entered.

Response to Amendment

Applicant's amendment of October 31, 2007 does not render the application allowable.

Status of Objections and Rejections

All rejections from the previous office action are withdrawn in view of Applicant's amendment.

New grounds of rejection under 35 U.S.C. 103(a) are necessitated by the amendments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2-6 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ting et al. (US patent 6077412) in view of Cheung et al. (US patent 6136163), Maydan et al. (US patent 6503375), Tepman et al. (US patent 6440261) and Poag et al. (US patent 6197123).

Regarding claims 2, 4 and 6, Ting et al. teach a semiconductor manufacturing apparatus comprising: an electrolytic plating chamber 10 (Figs. 1-2) with which an electrolytic plating apparatus responsible for electrolytic plating of a substrate is constructed; an electrolytic polishing chamber 10 (the additional electrolytic plating chamber can be used as a polishing chamber, Figs. 1-2, column 4, lines 18-31) with which an electrolytic polishing apparatus responsible for electrolytic polishing of the substrate is constructed; and a conveying chamber 51 (Fig. 12) having installed therein a conveying instrument 51 responsible for loading/unloading (column 17, lines 9-13) of the substrate to or from said electrolytic plating chamber and to or from said electrolytic polishing chamber, and being connected respectively to said electrolytic plating

chamber and said electrolytic polishing chamber, wherein the electrolytic plating and/or polishing chamber with which the electrolytic plating and/or polishing apparatus is constructed comprises: a holder 13 (Figs. 2-3) for holding the substrate; and a cup 12 (Figs. 2, 4-9) provided so as to oppose to said holder and is capable of forming a closed space, into which an electrolytic plating solution can be filled, together with the substrate held by said holder. In addition, Ting et al. teach a plurality of manifolds 18-20, i.e. nozzles, for supplying DI water to clean remaining fluid on or around the wafer support and for supplying nitrogen gas to provide the drying of the interior of the chamber (column 11 lines 15-30). The manifolds are also provided outside of cup 12. Ting et al. also teach drain 23, i.e. outlet portion, (Figs. 1-2) provided through the peripheral wall of the chamber. Each chamber within housing 49 of system 50 (Fig. 12) can function as an electrolytic plating chamber, an electrolytic polishing chamber, an electroless plating chamber, or a liquid treatment chamber.

Ting et al. differ from the instant claims in that the reference does not explicitly teach an annealing chamber or the shape of the conveying chamber. Ting et al. also differ from the instant claims in that the reference does not explicitly disclose a nozzle affixed on the peripheral sidewall of the chamber or an inlet portion provided through a peripheral wall.

Maydan et al. teach an apparatus comprising an annealing chamber 211 (Fig. 1).

Tepman et al. teach an apparatus for multi-chambered semiconductor wafer processing comprising a polygonal structure having at least two semiconductor process chambers disposed on one side. An area between the process chambers provides a

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maintenance access to the semiconductor processing equipment. Additionally, the apparatus may be clustered or daisy-chained together to enable a wafer to access additional processing chambers without leaving the controlled environment of the semiconductor wafer processing equipment (Abstract).

Cheung et al. teach an electroplating apparatus comprising a spin-rinse-dry module having nozzles placed above the substrate and outside of the diameter of the substrate to lessen the risk of the nozzles dripping on the substrate (column 5 line 66 -- column 6 line 1). According to the Merriam-Webster online dictionary (<http://www.m-w.com>), the word affix is defined as "to attach physically" or "to attach in any way". Therefore, the nozzle 340 of Cheung et al. as seen in Fig. 5 is broadly interpreted to be affixed to the chamber wall 330 by articulating member 343.

Poag et al. teach an apparatus for processing substrates such a semiconductor wafers comprising a chamber 12 (Fig. 1) having a production nozzle and two cleaning nozzles (36, 41). In addition, Poag et al. teach an inlet portion 33 provided through the peripheral wall 11 of the chamber 12 for supplying a gas into the chamber.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Ting et al. by using the annealing chamber of Maydan et al., because an annealing chamber is typically utilized in substrate processing systems to enhance the properties of the deposited materials by recrystallization of the deposited films, such as copper films, which can cause the flow of the deposited material to fill voids formed in features, purify layers of contaminants, such as oxygen, encourage diffusion of dopants, such as phosphorus, in the deposited

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materials, and manage crystal growth and orientation to control film properties (column 7, lines 49-61 of Maydan et al.).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Ting et al. by positioning the process chambers in a polygonal shape as taught by Tepman et al., because the polygonal structure of Tepman et al. allows for the addition of process chambers without compromising system foot-print and increased throughput and accessibility to the conveying chamber (column 3 lines 35-40 of Tepman et al.).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Ting et al. by affixing the nozzle on a peripheral sidewall of the chamber as taught by Cheung et al., because the nozzle would be positioned away from the substrate and therefore lessen the risk of the nozzles dripping on the substrate (column 5 line 66 -- column 6 line 1 of Cheung et al.).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the apparatus of Ting et al. by providing the inlet portion of Poag et al. through the peripheral wall of the chamber, because it would simplify the construction of the apparatus by obviating the tubing within the chamber to supply a process fluid.

Regarding claim 3, the apparatus of Ting et al. is structurally capable of supplying a cleaning liquid.

Regarding claim 5, Ting et al. teach manifolds 18-20 (Fig. 5), which are structurally capable of supplying a cleaning liquid or etching solution onto the surface of the substrate. The manifolds are also provided outside of cup 12.

Regarding claims 9 and 13, Ting et al. teach manifolds 18-20 (Fig. 5), which are structurally capable of supplying a cleaning liquid or etching solution onto the surface of the substrate. The manifolds are also provided outside of cup 12.

Regarding claims 10 and 12, Ting et al. teach the electrolytic plating or polishing chamber with which the electrolytic plating or polishing apparatus is constructed comprises: a holder 13 (Figs. 2-3) for holding the substrate; a cup 12 (Figs. 2, 4-9) provided so as to oppose to said holder and is capable of forming a closed space, into which an electrolytic plating solution can be filled, together with the substrate held by said holder; and a nozzle 18 (Figs. 5-6) for supplying a process liquid onto a surface of the substrate held by said holder.

Regarding claim 11, the apparatus of Ting et al. is structurally capable of operating with a cleaning liquid.

Response to Arguments

Applicants' arguments have been considered but are moot in view of the new ground(s) of rejection.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan V. Van whose telephone number is 571-272-8521. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LVV
November 20, 2007


NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700